

RCRA Interim Measures
Soil-Bentonite Slurry Wall Installation
Nitro, WV

Technical Submittal
Item No. 2- Health and Safety Plan (HASP)

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REVISIONS/ADDENDA TO HEALTH AND SAFETY PLAN

Revision	Date	Issued By	Revisions Made

1.0 INTRODUCTION

This document stands to fulfill the requirements of the Health and Safety Plan (HASP) as defined in Section 2.3.1 and 2.3.2 of the RFP. Additionally, provisions have been included to satisfy internal Geo-Solutions Inc. (GSI) procedures & SOPs and to fulfill the requirements set forth in OSHA regulations 29 CFR 1910 & 29 CFR 1926. Ultimately this document serves as a guideline for safe work practices during the site activities defined in the above reference RFP. In no way should this document be viewed as final or entirely complete in its nature and scope. This document shall be considered a fluid document, constantly changing and evolving to account for new information, changed site conditions, and unforeseen circumstances/conditions encountered during the construction work.

This HASP describes the program to be implemented by GSI for RCRA Interim Measures, Soil-Bentonite Slurry Wall Installation at the Solutia Nitro Site located in Nitro, West Virginia (a.k.a. Former Flexsys Nitro Facility). All work must be performed in accordance with applicable federal, state, and local regulations, including, but not limited to:

- U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) - 29 Code of Federal Regulations (CFR) 1910.120, "Hazardous Waste Operations and Emergency Response"; and,
- OSHA - 29 CFR 1926, "Safety and Health Regulations for Construction."

The health and safety practices, procedures, and personal protective equipment (PPE) requirements established within this HASP are based on hazards known to be present at this Site. All protective measures employed must be commensurate with known hazards associated with specific work activities and job tasks and must be modified if other hazards are identified during the course of the work. This HASP should not be used for activities other than those outlined in the scope of work unless a task-specific hazard and exposure assessment is performed and any additional protective measures incorporated into the HASP.

2.0 PROGRAM ORGANIZATION AND RESPONSIBILITIES

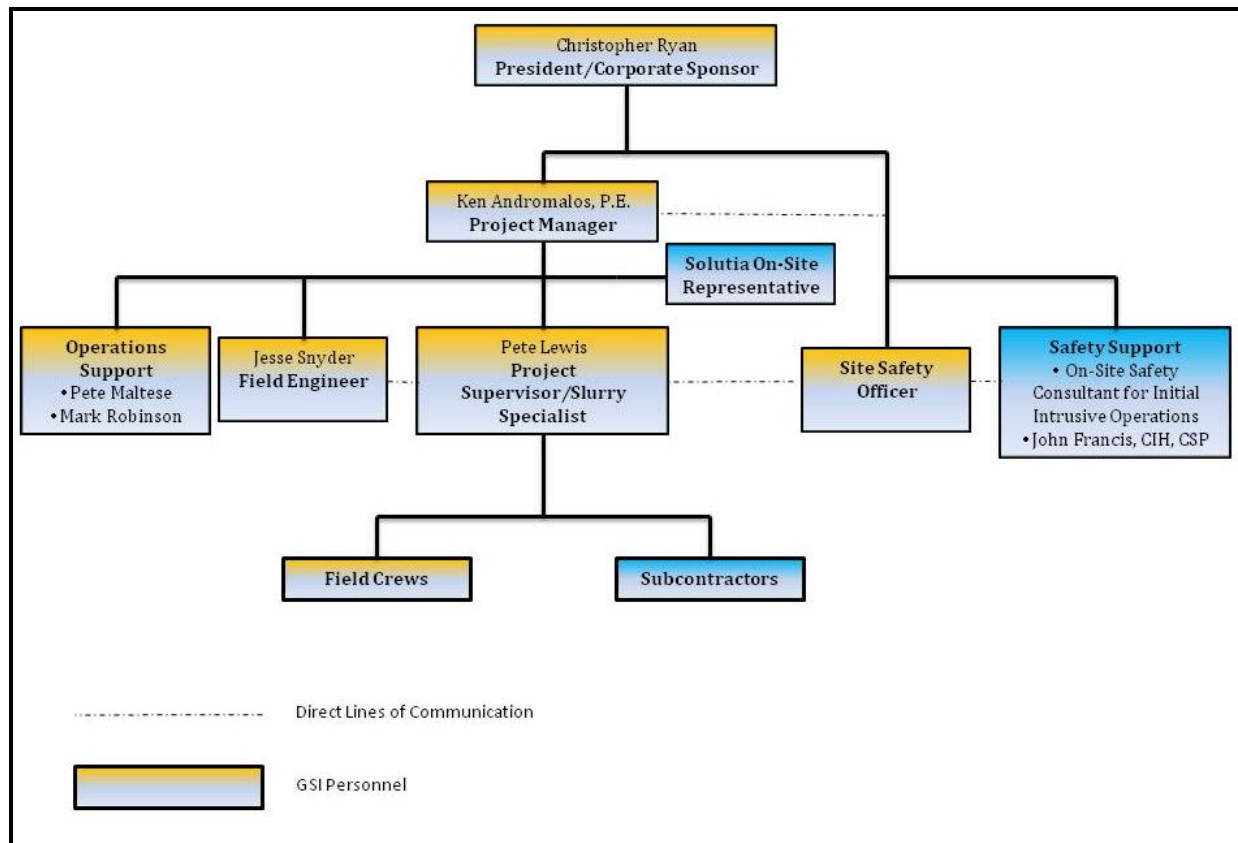
The design and implementation of the HASP are accomplished through an integral team effort comprised of the following:

- Project Manager - The Project Manager is responsible for assuring that all activities are conducted in accordance with the HASP. The Project Manager has the authority to suspend field operations if employees are in danger of injury or overexposure to harmful agents. The Project Manager's responsibilities include:
 - Coordinating the development of a Site-specific HASP for all phases of the project;
 - Ensuring that the appropriate health and safety equipment and PPE are available for project personnel;
 - Ensuring that all personnel have received the appropriate training before they engage in activities that are potentially hazardous;
 - Ensuring that all required personnel have received the required medical examination, testing, and screening before engaging in work activities; and
 - Designating a Site Safety Officer (SSO) and other Site personnel who will assure compliance with the HASP.
- Project Supervisor - The Project Supervisor is responsible for helping to ensure that all Site activities are conducted in accordance with the HASP. The Project Supervisor reports to the Project Manager. The Project Supervisor's responsibilities include:
 - Ensuring that field personnel, subcontractor personnel, and visitors comply with the requirements of this HASP;
 - Notifying the Project Manager of any changes in work conditions or tasks which may require changes to the HASP;
 - Suspending field activities if necessary, and resume activities when appropriate; and,
 - Delegating, if necessary and appropriate, some of these responsibilities to other on-Site qualified employees.
- Site Safety Officer - The Site Safety Officer (SSO) is responsible for ensuring that all Site activities are conducted in accordance with the HASP. The SSO has direct communication with the Project Supervisor and Project Manager, and reports to the President/Corporate Sponsor. The SSO's responsibilities include:
 - Ensuring that personnel, subcontractor personnel, and visitors comply with the requirements of this HASP;
 - Notifying the Project Manager of any changes in work conditions or tasks which may require changes to the HASP;
 - Suspending field activities if necessary, and resume activities when appropriate;
 - Coordinating safety meetings and daily safety briefings, as necessary;

- Managing health and safety equipment, including instruments, respirators, gloves, suits, and other PPE, used in field activities;
 - Acting as the Emergency Coordinator at the Site and arrange for emergency response in cooperation with local emergency and health officials;
 - Monitoring conditions during field activities to assure compliance with HASP;
 - Monitoring conditions during field activities to determine if more stringent procedures or a higher level of PPE should be implemented;
 - Maintaining a log to record conditions, personnel involved in field activities, and other pertinent health and safety data;
 - Overseeing the arrangement and execution of personnel and equipment decontamination;
 - Controlling visitor, subcontractor, and employee access to hazardous areas; and,
 - Delegating, if necessary and appropriate, some of these responsibilities to other on-Site qualified employees.
- Employees and Subcontractors - Employees and subcontractors will be responsible for the following:
 - Becoming familiar with, and complying with, the HASP;
 - Attending training sessions to review the HASP and other safety and health information;
 - Being alert to identified and non-identified hazards;
 - Reporting unidentified hazards to the SSO; and,
 - Conducting themselves in a manner that is orderly and appropriate for the Site.

The GSI organizational structure for this project is shown on the following page.

GSI ORGANIZATIONAL STRUCTURE



Project Team

Project Management

GSI considers the Project Manager, Project Supervisor, Site Safety Officer and the Field Engineer the Key Project Personnel. The major responsibilities and qualifications of the site Personnel related to this project are defined in the “Operations Plan”. The main responsibilities of the Site Safety Officer have been included here for reference.

Onsite Personnel

All other onsite personnel, including subcontractors and all subcontractor employees, will ultimately report to one of the Key Personnel listed above. Labor foremen and subcontractor supervisors will be identified as key points of contact.

Contact information

All GSI personnel will be available for contact via GSI’s main office in New Kensington, PA:

1250 Fifth Avenue
New Kensington, PA 15068

T: 724-335-7273

F: 724-335-7271

Cell phones and email addresses of Key Personnel will be provided prior to the start of work. An onsite trailer will be established after mobilization. An address and phone number (if applicable) for this site trailer will be provided as soon as possible.

3.0 SITE CHARACTERIZATION AND HAZARD ASSESSMENT

3.1 SITE BACKGROUND AND DESCRIPTION

The project site is the former location of a manufacturing plant known as the Flexsys Nitro Plant that manufactured a variety of chemicals. The site is situated immediately adjacent to the Kanawha River in Nitro, WV. The original site perimeter extended beyond the outside perimeter fence that currently exists at the site. The site is and has been underlain by a variety of known and unknown utilities and structures associated with the manufacturing plant. Many of these utilities at one time contained and may still contain hazardous materials

3.2 SCOPE OF WORK

The main aspect of this work scope is the installation of Soil-Bentonite (SB) Slurry Walls around three distinct portions of the site:

- Process Area (PA)
- Past Disposal Area (PDA)
- Wastewater Treatment Area (WTA)

The locations of these three areas relative to the rest of the site are shown in Figure 1. The general work tasks for this work scope are:

- Mobilization
- E&S Controls Installation
- Site Preparation – Clearing and Grubbing
- Utility Abandonment and Removal
- Work Pad Preparation
- HUB Park Drain Pipe Installation
- Slurry Wall Excavation
- Site Restoration
- Demobilization

A task-specific hazard analysis will be written for all main tasks and all affected workers will be informed of the task, hazards and controls during safety meetings.

3.3 CHEMICAL HEALTH HAZARDS

The main constituents of concern for the Site in and around areas of the planned slurry wall work include volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), asbestos and dioxin. These constituents may be found in site soils, groundwater, sediment or wastes.

- Aniline;
- N-Nitrosodiphenylamine;
- Total TCDF Dioxin;

- Total TCDD Dioxin;
- OCDD Dioxin;
- Trichloroethylene;
- Vinyl Chloride;
- Benzene;
- Chlorobenzene;
- 1,4-Dichlorobenzene;
- 1,3-Dichlorobenzene;
- 1,1-Dichloroethylene;
- Ethylbenzene;
- Isopropylbenzene;
- Toluene;
- Cis-1,2-Dichloroethene;
- o-Xylene;
- m,p-Xylene;
- Carbon Tetrachloride;
- Naphthalene;
- 2,4,6-Trichlorophenol; and,
- Tetrachloroethene.

In addition to the chemicals listed above, raw materials known to have been used at the Site include, but may not be limited to:

- Chlorine;
- Cyclohexylamine;
- Hydrogen peroxide, 20-40%;
- Tertiary butylamine;
- Carbon disulfide;
- Liquid caustic soda, 50%;
- Toluene;
- Hydroquinone;
- Isoamylenes;
- Nitrosomorpholine;
- 2-Ethylhexylacrylate; and,
- Ethylacrylate.

There is a potential for site workers to be exposed to these chemicals during site activities, but especially during soil disturbance/excavation associated with utility abandonment, clearing and grubbing, and the slurry wall installation. In order to protect site personnel from exposure, appropriate personal protective equipment (PPE) will be provided to all workers upon entrance to the work area(s). In addition, equipment and personnel decontamination will be performed at the exits from the work area(s). The PPE will be inspected, maintained, and/or replaced on a frequent basis (at least daily) depending on the work and site conditions encountered.

A summary of health hazard data is given in the following sections. **Table 1** presents exposure limits and other properties of certain chemicals that may be present at this Site.

The main route of exposure for Site chemicals is skin/eye contact and absorption; a second route of exposure is inhalation of vapors/dust during intrusive work activities. Incidental ingestion is also a possible route of exposure. Potential exposures will be reduced or eliminated by following the work practices and using the PPE designated in this HASP. The overall chemical health hazard assessment for activities covered by this HASP at the Site is low to moderate.

3.3.1 VOCs

The VOCs found on site may irritate skin on contact and irritate the respiratory tract on inhalation. Eye contact may cause eye irritation, burning and inflammation. Ingestion may result in nausea, vomiting, abdominal pain, rapid pulse, respiratory distress and shock. Absorption into the body systems by any route may cause trouble breathing, dizziness, headache, nausea, vomiting, salivation, and convulsions. Overexposure by inhalation may cause drunkenness, drowsiness, incoordination, tremors and restlessness, and an increase in heart rate and blood pressure. Chronic or long-term effects of overexposure to site constituents may cause dermatitis, and cancer of the liver, kidneys, and respiratory tract.

Many VOCs may be present in site soils and groundwater; however, VOCs with higher concentrations in groundwater and soils that may be of particular concern include trichloroethylene, benzene, ethylbenzene, toluene, xylenes.

3.3.2 SVOCs

Primary entry routes into the body for SVOCs are inhalation, ingestion, and skin contact. These materials generally pose less of an inhalation hazard than VOCs because they are less likely to volatilize. However, SVOCs can be a potential constituent of airborne dust and pose an inhalation hazard. Inhalation of certain SVOCs may irritate the respiratory tract. Eye contact may cause eye irritation, burning and inflammation. Immediate or acute effects from short-term skin exposure to many SVOCs include irritation; burning, itching, redness, skin color changes, and rashes from skin contact.

Photosensitization, a tendency to sunburn more easily or a worsening of rash with exposure to sunlight may occur with skin contact to certain SVOCs. If dust which contains SVOCs contacts the skin minor burning and irritation may result, especially with exposure to sunlight. Wash any exposed skin, apply sunscreen (SPF 30), and cover the area with clothing. Skin contact and exposure during Site activities can be eliminated by the use of proper gloves and PPE clothing to protect areas of exposed skin.

Many SVOCs may be present in soils and groundwater; however, a SVOC with higher concentrations in groundwater and soils that may be of particular concern is N-Nitrosodiphenylamine.

3.3.3 Asbestos

Asbestos may have been used in building, piping, and insulation materials used at the Site and may be found in some Site soils, abandoned utilities, and waste. Because the Site no longer functions as an operating plant, and the fact that the previously existing production facilities have been demolished and removed from the site, the potential for exposure to asbestos is low. Many of the buried utilities still exist and the possibility of encountering buried waste materials containing asbestos is a possibility. The SSO must evaluate all work areas that contain debris and piping for the presence of asbestos containing materials and take appropriate precautions as necessary. Nose, throat and skin irritation are possible upon exposure to high airborne concentrations of asbestos. Long term, high levels of airborne exposure may cause asbestosis (fibrosis or scarring of the lung), lung cancer, mesothelioma (cancer of the lining of the lung and/or abdomen), and pleural plaques (thickening of the lung's lining) which develop many years after exposure. Because of the short duration of the project and low potential for encountering asbestos the exposure potential during the project is low to moderate.

3.3.4 Dioxin

The facility produced a herbicide (2,4,5-Trichlorophenoxyacetic Acid) from 1948 until 1969. A byproduct of this production process was dioxin (specifically 2,3,7,8-tetrachlorodibenzo-p-dioxin or TCDD) which has been found in Site soil samples from areas within the facility. Dioxin concentrations at the Site are very low and are not anticipated to pose a major hazard to workers. Dioxin compounds have a very low solubility in water; primary entry routes into the body for dioxin compounds are inhalation and ingestion. The control of fugitive dusts during all construction related activities is important in minimizing exposures to dioxins at the site.

Acute health effects of overexposure to dioxin include irritation of the skin and eyes, headache, weakness, dizziness, nausea and vomiting. Exposure to high concentrations of dioxin or exposure over a long period of time can cause a skin condition called chloracne, reproductive effects, cancer, liver damage, and nervous system damage.

No occupational exposure limits have been established for dioxin. The National Institute for Safety and Health recommends that exposure be limited to the lowest feasible concentration.

3.3.5 Other Hazardous Substances Used at the Site/Hazard Communication

A list of hazardous chemicals and MSDSs for hazardous chemicals used at the Site by GSI or contractors will be kept at the Site in the GSI office trailer, under the care and responsibility of the SSO. All containers of hazardous substances must be labeled with the name of the chemical and appropriate hazard warnings. Employees and contractors who use hazardous substances must read the labels and know where MSDSs are located in case of an emergency. Personnel that will handle these chemicals are familiar with the hazards associated with them. Individuals that are not familiar with the hazards should notify their superior so that they may be properly informed.

3.3.6 Work Task Hazard Assessment

Table 1 presents exposure limits and other properties of certain chemicals that may be present at this Site. More information concerning the health effects of Site chemicals can be found in the Material Safety Data Sheets (MSDS). The overall chemical health hazard assessment for activities at this Site is low to moderate; although utility clearing and pipe breaking are considered high hazard activities since the contents and potential quantities of portions of these buried pipes are unknown. **Table 2** summarizes the known potential chemical hazards associated with Site work tasks, a relative hazard assessment, proposed initial levels of personal protection, and air monitoring requirements.

3.4 PHYSICAL HAZARDS

The primary physical hazards on the Site are those associated with operating and working around hydraulic and mechanical construction equipment, working in or around open excavations, driving, uneven terrain, the Kanawha River, heat stress during the summer months, and cold stress and snow in winter. Safe work practices for these potential hazards are outlined in Section 3.6 (heat stress), Section 3.7, (cold stress) and Section 5.0.

3.5 CONFINED SPACES

Entry into confined spaces is only allowed upon the approval of the GSI Health & Safety Manager. The GSI Health & Safety Manager will determine if entry is necessary and will detail specific entry procedures. GSI and OSHA confined space entry procedures must be followed, including atmospheric testing of the space and completion of a confined space entry permit before entry. A minimum of two trained employees must be present for any entry.

3.6 HEAT STRESS

Heat stress may be a concern during warm weather. *Heat cramps* are the least severe form of heat stress, cramps occur due to the depletion of body salts from sweating. *Heat exhaustion* results from significant loss of body salts and fluid. Its symptoms may include weakness or fatigue, nausea, headaches, and in more serious cases, clammy, moist skin with pale or flushed complexion. *Heat stroke* is the most serious heat-related condition and occurs when the body's system to regulate internal temperature fails. Symptoms are hot, dry skin; mental confusion or delirium; convulsions or unconsciousness; and body temperature of 105 degrees Fahrenheit (°F) or higher. In this situation, medical attention is needed immediately; heat stroke may be fatal.

To prevent heat disorders, attention must be paid to such variables as temperature, humidity, air movement, and the physical condition of employees. In addition, breaks must be taken as needed to let the body cool. Liquids designed to replace lost body salts must be provided regularly.

3.6.1 Heat Stress Prevention

Heat stress can occur even when temperatures are considered moderate. The following recommendations should be followed to help reduce heat stress:

- Personnel must drink plenty of liquids to replace body fluids lost to sweating. To prevent dehydration, personnel should be encouraged to drink generous amounts of water even if not thirsty. Heat-related problems can happen before the sensation of thirst occurs.
- Cool drinking water, 50°F to 60°F, should be made available to all personnel.
- Only water, or occasionally, electrolyte-balanced drinks, such as Gatorade®, should be used to replace lost fluids due to sweating.
- Beverages containing caffeine, such as colas, coffee, or tea, should be limited or not used because of their diuretic (water depleting) effects.
- Salt tablets should not be used unless prescribed by a physician.
- Self-monitoring of physical condition and buddy monitoring will be essential in order to prevent any heat stress illness. All personnel should be aware of heat stress symptoms and the proper precautions to take if heat stress is observed.
- Rest periods must be provided for all personnel. This means at least 15 minutes in the morning and in the afternoon and at least 30 minutes for lunch. A more frequent rest schedule may be implemented by the SSO depending on weather conditions and the type of work performed.

3.7 COLD STRESS

Cold weather conditions may result in cold stress ranging from mild frostbite to severe hypothermia. Cold injury and impaired ability to work are dangers at low temperatures and when the wind chill factor is low. Cold stress normally occurs in temperatures at or below freezing, or under certain circumstances, at temperatures of 40 °F. Extreme cold for a short period of time may cause severe injury to exposed body surfaces or result in profound generalized cooling, causing death. Areas of the body that have high surface area to volume ratio, such as fingers, toes and ears, are the most susceptible. Two factors influence the development of a cold weather injury: ambient temperature and wind speed. For instance, 10 °F with a wind of 15 miles per hour is equivalent in chilling effect to still air at -7 °F. A wind chill chart is presented on the following page.

It does not have to be extremely cold for systemic hypothermia to occur. *Hypothermia* may occur at outdoor temperatures approaching 50 °F. Systemic hypothermia occurs when the body core temperature decreases. Symptoms begin with shivering, apathy, loss of coordination, followed by lethargy and coma; if allowed to continue, hypothermia may result in death. Get the victim out of the cold and into dry clothing. Warm up his or her body slowly. Give nothing to eat or drink until the victim is fully conscious. Warm fluids, but no stimulants such as tea, coffee, alcohol or tobacco should be given. Get medical attention immediately.

Frostnip, or incipient frostbite, usually involves the ears, nose, chin, cheeks, and fingertips and toe tips. It occurs during high wind, low temperature, or both. The skin suddenly blanches (becomes white). Frostnip is painless and can be reversed without tissue damage by warming the affected area by using warm water. The area should not be rubbed.

Superficial frostbite is a more severe local cold injury. This involves the skin and superficial tissue just beneath it. The skin becomes white, waxy, and firm; the tissue beneath it remains soft. Affected personnel should be taken out of the cold and the affected area slowly and carefully rewarmed. Again, the area should not be rubbed. Stinging and burning may follow warming and superficial blisters may occur.

Deep frostbite involves freezing not only of skin and subcutaneous tissue but even muscle and bone. The emergency treatment for deep frostbite is immediate warming. Affected persons should be kept dry, provided with external warming, and the frostbitten part covered by a dressing while being transported promptly to the nearest emergency department. Warm fluids, but no stimulants such as tea, coffee, alcohol or tobacco should be given to frostbite or hypothermia victims.

3.7.1 Cold Stress Prevention

To prevent or minimize the effects of cold stress, the following work practices should be followed:

- Use dry, insulated and/or layered work clothing, warm gloves, hard hat liners, and boots. Combine winter gear with chemical resistant personal protective equipment and waterproof gear to provide the best protection for the given site task and weather conditions.
- Provide rest breaks in warm areas as necessary.
- Use the following wind chill chart to estimate the effects of wind and temperature on the body. Be especially careful to note when frostbite is a potential hazard.

WIND CHILL CHART																	
Wind Speed	Temperature (°F)																
Calm	40	35	30	25	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91
Frostbite Times								30 min.	10 min.	5 min.							

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where T = Air Temperature (°F), V = Wind Speed (mph)

From National Oceanographic and Aeronautics Administration and the National Weather Service, 2002

3.8 BIOLOGICAL HAZARDS

Biological hazards present at the Site may include poisonous plants, insects, and animals. Poison ivy and poison oak may be present in the vegetated areas at the site. Contact with the leaves, vine, roots, or sap causes a skin rash on many people. All workers must be familiar with the appearance of poison ivy (three leaves) and wear impervious protective clothing as necessary to prevent contact with poison ivy.

Ticks may be present throughout the Site on brush, grass, and weeds. Some ticks carry disease, such as Lyme disease or Rocky Mountain spotted fever. Wear protective clothing or secure pant legs to lower leg or boot and apply bug repellent to this area. Frequently assist each other in inspecting for ticks. If a tick is found attached to the skin, do not attempt to pick the tick off the skin with fingernails or scrape with a credit card, etc. Carefully remove the tick with tweezers taking care that all parts are removed. Thoroughly scrub the area with soap and water. Save the tick in a small jar or plastic bag and take it to a doctor or health department for identification. If a red circle or rash forms in the area of the tick bite or if flu-like symptoms appear in a few days or weeks consult a doctor for treatment.

A particular hazard at this Site during warmer weather is mosquitoes. Besides the annoyance of the buzzing insects and ordinary mosquito bites, some mosquitoes can transmit West Nile Virus and other diseases. West Nile Virus can be a serious disease, especially for people over 50 years old. Most people have no symptoms after infection but some people have mild symptoms that can include fever, headache, body aches, nausea, vomiting, and swollen lymph glands or a skin rash on the chest, stomach and back. Symptoms last a few days to several weeks. A few people develop severe illness. Symptoms may include high fever, headache, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, vision loss, numbness and paralysis. Symptoms may last several weeks and neurological effects may be permanent. People older than 50 are at a higher risk to get sick, a very few people may die from a West Nile virus infection.

The best way to prevent West Nile Virus is to avoid being bitten by mosquitoes. When working outdoors wears light-colored long sleeve shirts, long pants and socks sprayed with insect repellent. Use repellent carefully! Follow the manufacturer's directions for the repellent you are using. Repellents with DEET (N, N-diethyl-meta-toluamide) or permethrin are effective against mosquitoes and other biting insects. You can use DEET directly on your skin and clothing but do not use on skin under clothing. Use permethrin only on clothing, not directly on skin, and let sprayed clothing dry before use. Repellents with a higher concentration do not mean they work better but that they work longer.

According to the Centers for Disease Control (CDC), a recent study indicated the following:

- A product containing 23.8% DEET provided an average of 5 hours of protection from mosquito bites.
- A product containing 20% DEET provided almost 4 hours of protection.
- A product containing 6.65% DEET provided almost 2 hours of protection.

- Products containing 4.75% DEET and 2% soybean oil were both able to provide roughly 90 minutes of protection.

Sweating or getting wet may mean you need to re-apply repellent more frequently. If possible wash exposed skin before re-applying repellent. Be sure to wash skin that was sprayed with repellent at the end of the day. Wash hands before eating or using the restroom.

Wasps, bees and other stinging insects may also be found at the Site. Use of DEET or repellent containing permethrin will help keep wasps and bees away. However, if a nest is disturbed the repellent will not help. Be alert for bees flying into and out of a particular area, hanging nests, and nests in logs, pipes and other structures. Wear light-colored clothes as darker clothes tend to annoy some stinging insects.

First aid for insect bites and stings includes: applying a baking soda paste or ice wrapped in a wet cloth. Commercial bee sting kits may be helpful. Honeybees leave their stingers in the body; these can be removed by gently scraping the skin, working side to side of the stinger. A bee sting or snake suction device can also be used. If an insect bite becomes red or inflamed or the person becomes dizzy, nauseous, or short of breath then get to medical care immediately.

Avoid unnecessary contact with animals. Some animals may carry disease or poison or may cause injury by biting. If an animal is acting strangely, or if a wild animal approaches humans, leave the area. If necessary, call animal control personnel. Do not try to feed wild animals.

Snakes may also be present on the Site. Leave snakes alone, do not attempt to catch or kill. Stay out of tall grass, brush, and wood or rock piles. Keep hands and feet out of areas you cannot see. If bitten, get the person to medical help immediately. If practical, try to quickly identify the type of snake or at least the color and markings and size. First aid for snake bites includes: Wash the bite with soap and water or antiseptic cleanser, immobilize the bitten area and keep it lower than the heart, cover the area with a clean, cool compress or a moist dressing to minimize pain and swelling. Keep the victim calm and comfortable. If the victim cannot reach medical care within 30 minutes apply a bandage, wrapped 2 to 4 inches above the bite, to help slow the venom. This should not cut off the flow of blood from a vein or artery – the band should be loose enough to slip a finger under it. Without cutting, place a suction device over the bite to help draw venom out of the wound. Continue alternating suction and application of a compress while transporting to a doctor or hospital. Do not give the victim food or alcohol and only limited other liquids as necessary.

4.0 MEDICAL SURVEILLANCE

All medical examinations and procedures are performed by or under the supervision of a licensed physician at no cost to employees, without loss of pay, and at a reasonable time and place.

4.1 PRE-ASSIGNMENT SCREENING

Employees who perform the work tasks outlined in this HASP must have a current medical screening and approval for work at hazardous waste sites in accordance with 29 CFR 1910.120(f) and the company medical screening policies and procedures. This screening includes:

- Comprehensive medical/occupational history and physical examination;
- Visual acuity and color vision;
- Audiometry (OSHA) - 500, 1000, 2000, 3000, 4000, and 6000 Hz, both ears;
- Complete blood count, including platelets;
- Complete serum profile (including serum chemistry, liver profile and serum lipids);
- Chest X-ray, posterior/anterior view, if not taken in the past three years (results must be available to examining physician), or if indicated by medical necessity;
- Spirometry (pulmonary function test);
- Urinalysis; and,
- Electrocardiogram (EKG), if medically necessary.

The physician will provide a written opinion regarding the potential employee's fitness for working at a hazardous waste site, ability to wear a respirator, and any limitations upon the employees assigned work. Employees are furnished a copy of the written opinion, and results of the medical examination and tests upon request.

The company will schedule medical examinations, select appropriate clinics or physicians, review physicians' reports, and maintain employee medical files. Employee medical files are confidential and will not be released without the express written approval of the employee. A copy of all physicians' reports, results and opinions and medical monitoring data will be made available to the employee upon request.

Repeat tests or additional tests or examinations recommended by the physician, based on the initial medical screening and related to the employee's ability to work in hazardous environments, will be arranged by the company.

4.2 PERIODIC MEDICAL EXAMINATIONS

Employees engaged in work with potential exposure to hazardous materials will undergo an annual update of medical and occupational history and an annual physical examination. More frequent medical examinations, consultations, and/or laboratory testing will be provided:

- For employees who, in an emergency situation, may have been exposed to hazardous substances at or near permissible exposure limits (PELs);

- As soon as possible, upon notification by an employee, that the employee has developed signs or symptoms indicating possible overexposure to hazardous substances or health hazards; and,
- If the examining physician determines that an increased frequency of examination is medically required.

The company will arrange for periodic medical examinations and maintain records in the employee's medical file.

4.3 MEDICAL RECORDS

All medical records, including pre-employment medical screening, periodic medical examinations, emergency and non-emergency treatment records, and accident reports, will be maintained in accordance with the following:

- OSHA 29 CFR 1910.1020 - Medical records.
- OSHA 29 CFR 1904 - Injuries, illnesses, and annual summaries.

4.4 TERMINATION EXAMINATION

Upon termination from employment, all employees whose work involved potential exposure to hazardous materials and who have not received a medical examination within the previous six months will be provided a termination examination. Records of the termination examination will be maintained in accordance with 29 CFR 1910.1020. Employees will be notified regarding termination physical examination requirements.

4.5 SUBCONTRACTORS

Subcontractors who will perform work at this Site where there is a potential for contact with Site constituents are required to follow the medical surveillance requirements of 29 CFR 1910.120 and a medical surveillance program.

4.6 MEDICAL SURVEILLANCE CERTIFICATION

GSI will certify that all supervisory and on-site personnel have received the appropriate medical examinations and are able to perform the tasks required for this project.

4.7 DRUG TESTING CERTIFICATION

GSI will submit their drug testing program to Solutia for review before construction activities start. GSI will certify that all site personnel have had a negative drug test in accordance with Solutia policy.

5.0 WORK PRACTICES AND SITE CONTROL

5.1 ROUTINE SAFE WORK PRACTICES

Hygienic practices consistent with work hazards are necessary. Eating and food preparation will be prohibited in any area other than those designated and properly protected (the Support Zone). Employees who handle potentially contaminated materials or articles will wash with soap or mild detergent and water before eating or using the rest room.

5.2 WORK RESTRICTIONS

All outdoor work at the Site must be conducted during daylight hours unless adequate lighting is provided. Outdoor work must cease immediately upon the signs of impending thunderstorms and lightning or other severe weather, as determined by the Project Supervisor and SSO.

5.3 CLEARING AND GRUBBING

Brush clearing operations may involve the use of a brush hog, bulldozer, chain saw, weed cutter and other equipment. Employees must follow the manufacturer's operation and safety recommendations for all equipment used. Wear eye protection, hearing protection, gloves, safety boots and adequate clothing to prevent lacerations and abrasions. Do not wear loose clothing or jewelry that could get caught in the chain or cutting edges. Avoid poison ivy when possible and wear protective clothing and boots and wash thoroughly after clearing to reduce the potential for contracting a rash from poison ivy. Be alert for snakes, bees, and other hazards while clearing. Store gasoline in approved safety cans and be careful when refueling gasoline powered tools. Gasoline is extremely flammable; the engine should be stopped and cooled before refueling. Do not spill fuel when refueling.

5.4 UNDERGROUND AND OVERHEAD UTILITIES

Underground utilities and pipelines can present special hazards such as electrocution, sudden release of pressure (gas or liquid), and explosion and fire. Underground installations such as sewer, fuel, natural gas, electrical, water, and other lines as well as underground tanks must be identified and marked before digging, drilling or excavation, if possible.

Never take the exact location of even marked utilities for granted. Begin each excavation slowly and cautiously, taking care to check for the presence of structures or lines for at least the first three feet of depth. In some cases hand augering and probing with a non-conductive probe may be necessary.

Check for any overhead wires before work. Keep equipment at least 20 feet away from overhead lines.

Level C or Level B may be required when excavating and plugging pipes, conduits and other voids to ensure the integrity of the slurry trench. The required level of protection will likely be a determination of the SSO after evaluating available information concerning each particular work area.

5.5 OPERATING HAZARDS

Operating hazards during construction activities may include work near construction and heavy equipment use, noise, electrical equipment and power lines, and excavations. The employees who are most at risk of being injured are individuals unfamiliar with the site and/or construction equipment. The initial site orientation by the Construction Contractor should include a review of the equipment to be used on-site, operating hazards and precautions, and the assignment of only trained and qualified personnel to operate equipment.

Working Near Construction Equipment

- Never stand directly in front of a backhoe or front end loader; the operator cannot see you.
- Never stand or walk under a backhoe shovel or crane boom.
- Never walk or stand under loading or unloading equipment (i.e., when you are in an excavation). Also beware that equipment such as cranes and trucks with hydraulic lift beds can tip. Avoid standing next to them when in use.
- Wear light or brightly colored clothing. This may include safety vests.
- Maintain visual contact with machine operators. Coordinate with the operators a safe place to stand when you are not directly involved with site activities such as sampling or air monitoring.
- Prearrange a hand signal communication system with machine operators. The use of whistles, hand radios, and horns to communicate is also appropriate.
- If you are not familiar with the hand signals to guide heavy equipment operations or cranes do not attempt to direct their activities. Only trained signal persons may direct crane and other activities that use specialized hand signals.
- Two or more people should not simultaneously climb a ladder or access/egress ramp.
- Communicate with machine operators to ensure that your means of access/egress is not blocked by the equipment.

Noise

- Wear hearing protection as required by facility rules and in any marked area requiring hearing protection.
- Wear hearing protection while operating or working near heavy equipment, drill rigs, power tools, etc.
- A field rule is to use hearing protection if you cannot hear normal conversation within an arms length of the person talking.
- Wear hearing protection if sound levels exceed those shown on the following table:

Duration per day, hours	Sound level, dBA slow response
8	85
4	90
2	95
1	100
½	105
¼	110

Impact noise	140
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Electrical Hazards

Overhead power lines, downed electrical wires, and buried cables all pose a danger of shock or electrocution if workers contact or sever them during site operations. Electrical equipment used on site may also pose a hazard to workers.

- Use low voltage equipment equipped with ground fault circuit interrupters and corrosion resistant connection cables while working on site.
- Inspect all electrical equipment periodically to ensure that the ground pathway is in working order.
- Monitor weather conditions and suspend work during electrical storms.
- Ground and discharge capacitors and other electrical equipment that may retain a charge before handling.

Excavations

To avoid cave-ins, excavation/trenching preplanning is of the utmost importance. Factors to be consider these items when planning any excavation or trenching operation:

- Location of underground utilities
- Soil type
- Soil moisture
- Previous soil disturbance
- Size and depth of excavation
- Length of time that excavation will be opened
- Weather conditions
- Type of excavation equipment
- Distance from excavation to existing structures
- Type and quantity of traffic in the vicinity of the excavation
- Possible sources of shock and vibration near the excavation
- Need for shoring.

5.6 EXCAVATION AND TRENCHING - GENERAL

Excavation and trenching are major hazards of construction; a number of precautions must be taken to prevent cave-ins or other accidents. An excavation is defined as any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal. A trench is a narrow excavation. In general, the depth of a trench is greater than the width, but the width of a trench (at the bottom) is not greater than 15 feet.

The following site conditions must be taken into account when planning excavation work:

- Traffic
- Nearness to structures and their condition
- Soil type

- Surface and groundwater
- Depth to water table
- Overhead and underground utilities
- Weather

All excavations must be dug in accordance with OSHA 29 CFR 1926, Subpart P, “Excavation, Trenching, and Shoring.” The following is a summary of excavation requirements:

- Determine the exact location of underground utilities before excavation. While the excavation is open protect, support, or remove the underground installation as necessary to safeguard personnel.
- All surface encumbrances (e.g., trees, boulders, etc.) must be removed or supported if they present a hazard to employees. Surface encumbrances can collapse on employees when undermined by excavation activities and can also interfere with traffic.
- Use support systems to ensure the stability of adjacent structures if necessary.
- Employees exposed to vehicular traffic must wear warning vests made of reflective or high visibility material.
- Water must not be allowed to accumulate in excavations. Water can lead to cave-ins.
- Employees must not work on faces of sloped or benched excavations at levels above other employees unless the employees at the lower level are protected from the hazard of falling, rolling, or sliding material or equipment.
- Personnel are not permitted on the downgradient side of heavy equipment when operating on a grade. A safe pathway must be determined before moving equipment from one location to another.
- Employees are not permitted under loads handled by lifting or excavation equipment. To avoid being struck by debris employees must also stand clear of trucks being loaded or unloaded.
- If a machine operator does not have a clear view of an excavations edge a warning system such as barricades or hand signals must be used to ensure that equipment does not fall into the excavation.
- Walkways must be provided where employees or equipment are required to cross excavations. Standard guardrails must be provided where walkways are 6 feet or more above the lower level.

IF PERSONNEL ARE TO ENTER AN EXCAVATION OR TRENCH:

- The sides of trenches greater than 5 feet deep must be shored, unless they are sloped to the angle of repose, or unless the trench is in solid rock. Check the OSHA standard 29 CFR 1926.650-652 and Appendices for appropriate requirements depending on soil type. Soil classification must be performed when designing a sloping or benching system. Shoring must be adequate to prevent wall collapse in whatever soil condition encountered.
- Excavations more than 20 feet deep must be designed by a registered professional engineer.

- Trenches or excavations 4 feet deep or deeper must be provided with a means of entering and exiting (i.e., ramps or ladders). A worker must not be more than 25 feet away from a means of exit. Ladders must extend from the bottom of the trench to at least 3 feet above the surface of the ground.
- The atmosphere of any excavation 4 feet or deeper must be tested for oxygen content, flammable gas, and other potential hazardous substances before employees may enter if a hazardous atmosphere or lack of oxygen can reasonably be expected.
- Emergency equipment, such as breathing apparatus, a safety harness and line, or a basket stretcher, must be readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during work in the excavation. This equipment must be attended while in use.
- Employees must be protected from loose rock or soil that could pose a hazard by falling or rolling from an excavation face.
- Employees must be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Materials and equipment must be kept at least two feet from the edge of the excavation, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations.
- Water must not be allowed to accumulate in excavations; water can lead to cave-ins.
- Daily inspections of the excavation, adjacent areas, and protective systems must be made by a competent person for evidence of a situation that could result in possible cave-ins, failures of protective systems and equipment, hazardous atmospheres, or other hazardous conditions. Inspections are required before the start of work and as needed throughout the shift and after every rainstorm or other hazard-increasing occurrence. Inspections are only required when employee exposure to hazards is reasonable anticipated.
- If the competent person finds evidence of a dangerous situation, employees must be removed from the hazardous area until precautions are taken to protect employees.
- Additional information on soil classification, slope configuration, timber shoring, aluminum hydraulic shoring, and other alternatives are found in Appendix A through E at the end of the OSHA excavation standard 29 CFR 1926.650-652.

5.7 SLURRY WALL INSTALLATION

The slurry wall will be a narrow trench of varying depth around the Site filled with the soil-bentonite slurry. No personnel will enter the trench. An excavator, bulldozer and other heavy equipment will be used to construct the slurry wall.

Potential hazards include overhead and underground utilities; caught between or contact with moving equipment; personnel or equipment falling into the excavation; noise exposure; and potential inhalation and skin exposure to VOCs and SVOCs. Follow the precautions in previous sections for heavy equipment and excavation safety. Ensure that personnel and equipment is kept at least two feet away from the edge, and more as necessary, to avoid collapse of the excavation. Monitor for VOCs and dust as outlined in Section 7.0. Dust will be controlled to reduce or eliminate potential exposure to site constituents.

5.8 SLIP, TRIP, FALL

Hazards throughout the Site include uneven terrain, holes, ditches, unstable slopes, slippery surfaces, unmarked projections, and ground debris that can cause employees to trip and fall. Sediment and surface water sampling in the river requires walking down slopes and walking on the river sediment. Take care to notice and avoid unsafe site conditions.

- Visually examine slopes for stability;
- Test your footing;
- Take sure the walking/work area is adequately lit;
- Be aware of ground debris; remove broken glass, nails, wire, and other debris if possible, or mark off and avoid areas of heavy debris.

5.9 DUST CONTROL

When dust generating activities are performed dust control must be achieved with a combination of work practice and engineering controls. Work practices to control exposure to dust include working upwind when possible, limiting the speed of vehicle travel at the Site, and using care to limit excess dust during construction activities. Engineering controls used may include water spray or other methods to keep dust down.

5.10 HOT WORK

Hot work will not be performed by GSI personnel. If a GSI subcontractor needs to perform hot work, then all hot work will be performed by authorized personnel in accordance with a hot work permit.

- Remove, shield, or cover with noncombustible material all flammable or combustible materials within 35 feet of hot work. Clean the work piece of oil, grease, paint, or chemical residue. Remove any combustible floor debris.
- No hot work may be performed in areas where flammable paints or other flammable materials or heavy concentrations of dust may create a hazard.
- Test the oxygen content and LEL before performing hot work in confined spaces, trenches or other areas where flammable gases may accumulate.
- Provide a fire watch person for the duration of the hot work (if all fire precautions cannot be maintained), and for 30 minutes after the completion of work.
- Provide fire extinguishing equipment for use while hot work is performed.
- Post warning signs around the area of hot work.
- Use the appropriate ventilation, welding helmets and goggles, respiratory protection, and other PPE to protect from air contaminants, sparks, welding rays, and other hazards involved with the specific welding job.
- Protect yourself and others from hot and/or falling objects while cutting or welding by supporting the object to be worked on, changing procedures, or tying off the work with noncombustible line.
- Tanks, drums piping, or other containers must be emptied and cleaned thoroughly, disconnected or blanked, and vented or purged before performing hot work.

- For work in confined spaces follow confined space entry procedures and permit requirements as well as hot work procedures. Ventilate the space or use airline respirators, continuously monitor the atmosphere for oxygen and flammables, keep compressed gas cylinders outside the space, and shut off the gas supply to torches outside the space and remove the hoses when not in the space.

5.11 SITE ACCESS/SITE CONTROL

5.11.1 Site Access

Access to the Site is from WV Route 25 via a locked gate. The Site is fenced along its perimeter.

5.11.2 Work Zones

Exclusion Zone

The Exclusion Zone (EZ) is defined here as any area of the site that contains or could contain contamination. This zone will primarily consist of the areas within the slurry wall alignments. The border of the exclusion zone, a.k.a the hot lines, will be clearly marked using silt fence and super silt fence, but should be easily identifiable by the diversion berm on the outside edge of the slurry wall alignment. All site excavation activities and equipment/personnel decontamination will take place within an exclusion zone.

Contaminant Reduction Zone (CRZ)

The contaminant reduction zone (CRZ) is defined here as any area of the site that directly surrounds an exclusion zone. This zone is meant to serve as a buffer between the exclusion zone and the support zone. The outside border of the CRZ will be clearly marked using traffic cones and yellow or orange spray paint. Final decontamination and work observation will take place within a CRZ.

Support Zone

The support zone is defined here as any area of the site that is not a part of the exclusion zones or CRZs. This zone is meant to be a “clean” area for support of the operations in the exclusion zone and CRZ. The outside border of this zone will be demarcated by the site perimeter fence. All site activities outside of excavations and decontamination will take place within the support zone.

Work zones may be adjusted as necessary depending on site-specific conditions. All site personnel and visitors will be informed of the Site work zones and restrictions for each.

5.12 SITE HOUSEKEEPING

All equipment and materials carried to work locations will be carried out. Used disposable clothing and equipment will be placed in plastic bags immediately upon removal and the bags

closed. PPE may be placed in a drum for subsequent disposal. The Site and trailer will be kept neat and free of unnecessary debris, as much as possible.

5.13 SANITATION/CHANGING FACILITIES

There will be several portable toilets onsite during construction operations. Portable toilets will be located near the work area(s) where construction activities are being performed. A portable toilet will be located near the Site trailer and hand sanitizer will be available. Potable water will be available in jugs at the Site.

5.14 CONTAMINATION AND EXPOSURE PREVENTION

Personnel must wear Level D protection at a minimum and upgrade as necessary per this HASP and at the direction of the SSO. Personnel must not walk in areas with potential Site constituents unless necessary and stay upwind of operations when feasible.

5.15 SITE COMMUNICATIONS

Telephones - A cell phone will be used for on-Site and off-Site communication. The Site trailer will be equipped with a telephone for use by authorized personnel.

6.0 PERSONAL PROTECTIVE EQUIPMENT

The objective of the protective equipment (PPE) program is to protect employees from safety and health hazards present at the Site and to prevent injury to workers from incorrect use and/or malfunction of PPE. No single combination of protective equipment and clothing is capable of protection against all hazards. PPE must be used in conjunction with safe work practices, decontamination, and good personal hygiene.

6.1 SITE-SPECIFIC LEVELS OF PROTECTION

The level of protection for most Site activities will be Level D or a modified Level D. However, some activities may need to be performed in Level C and Level B.

Level D will consist of:

- Long or short-sleeve shirts and long pants;
- Appropriate gloves for material handling activities, as needed. Use nitrile gloves when handling soil or groundwater that may contain Site constituents;
- Steel-toe and shank safety boots;
- Hard hat;
- Safety glasses with side shields; and,
- Hearing protection as required.

Modified Level D will consist of Level D as above plus:

- Regular or polycoated Tyvek (or similar material) as necessary to prevent skin contact;
- Nitrile gloves; and,
- Nitrile or other chemically resistant overboots.

6.2 UPGRADE CONDITIONS

If conditions should change where there is a possibility of overexposure to dust or organic vapors, dust/vapor suppression techniques must be used, or employees should work upwind to reduce potential exposures. If these measures do not reduce concentrations below the acceptable levels set forth in Section 7.0, then the level of protection will be upgraded to Level C as necessary.

Level C protection will consist of:

- NIOSH-approved half or full-face, air-purifying respirator equipped with appropriate combination organic vapor and P100 dust cartridges. Dust-resistant safety goggles will be required if half-face respirators are worn. Beards that interfere with respirator fit are not allowed for field personnel that will be required to wear a respirator. Respirator cartridges must be changed at the end of each work shift and new cartridges installed before the next shift when respirators are required. Respirator cartridges also must be changed if breathing becomes difficult or if the filters become wetted.

- Chemical-resistant clothing over work clothes, regular Tyvek®, or polycoated Tyvek®, as necessary.
- Nitrile outer gloves and nitrile inner gloves.
- Steel-toe, steel shank safety boots with nitrile, butyl rubber or neoprene chemical-resistant outer boots.
- Hard hat.
- Hearing protection as required.

Organic vapor respirator cartridges may be used for one work shift only or only as long as calculated according to the manufacturer's respirator cartridge life calculator, not to exceed one work shift. Once a respirator cartridge is removed from the manufacturer's sealed bag it must be used or discarded. If information is developed about Site constituents and airborne concentrations that may be used to calculate organic vapor respirator cartridge life under specific work conditions then that information must be used.

Level B protection is a potential during certain Site activities where there is little or no information on the type and concentration of constituents that may be encountered such as portions of the utility clearing phases and potentially during portions of the HUB Park Drainage pipe. The SSO has the responsibility for monitoring Site and work task conditions and deciding the appropriate level of protection based on the air monitoring guidelines presented in Section 7.0 and any other indications of potential exposure.

Level B equipment includes:

- 1 SCBA or pressure-demand supplied air respirator with escape SCBA;
- 2 Hooded chemical-resistant clothing (coveralls; one or two piece chemical-splash suit; disposable chemical-resistant coveralls);
- 3 Coveralls*;
- 4 Chemical-resistant outer gloves;
- 5 Chemical-resistant inner gloves;
- 6 Chemical-resistant steel toe and shank boots;
- 7 Disposable boot covers, chemical-resistant*;
- 8 Hard hat;
- 9 Two way radios; and,
- 10 Face shield.*.

*Optional; as applicable.

Combinations of PPE other than those described for Levels B, C, or D protection may be more appropriate and may be used to provide the proper level of protection.

Facial hair, long hair or stubble that may interfere with the sealing surface of a respirator is prohibited. Eyeglasses with temple pieces may not be used with respirators; a compatible spectacle kit and lenses must be worn. There is to be no gum or tobacco chewing during respirator use.

6.3 PPE USE AND LIMITATIONS

PPE is selected to protect employees from the specific hazards that they are likely to encounter during their work on site. Selection of appropriate PPE is a complex process that must take into consideration a variety of factors. Key factors involved in this process are:

- Hazard identification;
- Potential exposure routes;
- Performance of PPE materials;
- Work tasks to be performed:
 - Durability of PPE;
 - Heat stress and task duration; and,
 - Matching of PPE to work tasks.

The more that is known about site hazards, the easier the job of PPE selection becomes. As more information about site hazards becomes available, the SSO can make decisions to upgrade or downgrade the level of protection to match the tasks at hand. PPE selection, evaluation, and re-selection is an ongoing process.

The following are guidelines for the selection of appropriate PPE. Site-specific information may suggest the use of combinations of PPE selected from the different levels described below as being more suitable to the hazards of the work.

6.4 PPE TRAINING AND PROPER FITTING

Workers are trained in the proper use and fitting of PPE during the initial 40-hour hazardous waste course. This training is re-emphasized during the annual 8-hour refresher training. In addition, at the start of the project employees are reminded of the proper fitting of PPE for the tasks to be performed. If respirators may be used during a project workers are also trained according to the OSHA respiratory protection standard, 29 CFR 1910.134.

At a minimum the training points out the user's responsibilities and explains the following, using both classroom and field training when necessary, as follows:

- The proper use and maintenance of selected protective clothing, including capabilities and limitations.
- The nature of the hazards and the consequences of not using the protective clothing.
- The human factors influencing protective clothing performance.
- Instructions in inspecting, donning, checking, fitting, and using protective clothing.
- Use of protective clothing in normal air for a long familiarity period.
- The user's responsibility (if any) for decontamination, cleaning, maintenance, and repair of protective clothing.

- Emergency procedures and self-rescue in the event of protective clothing/ equipment failure.
- The buddy system.

7.0 MONITORING

Air monitoring is an integral part of the HASP and is used to help determine the appropriate level of protection for field personnel. The SSO, or qualified designee, is responsible for all air monitoring at the Site. Air monitoring action levels are presented on the next page. The SSO will use these action levels to assist in determining the need to upgrade or downgrade the level of PPE.

7.1 REAL-TIME MONITORING - VOCs

Real-time monitoring equipment for work where there is a potential for VOC exposure will include a 10.6 volt photo-ionization detector (RAE Systems MiniRAE 2000 or equivalent). Monitoring should be performed in the breathing zone prior to and during intrusive activities and any other activities where there is a potential for exposure to VOCs. If VOCs are consistently detected above background in the work areas then additional area or personal air monitoring or sampling may be necessary to identify the VOCs contributing to PID readings. Readings may be recorded in the Site field log or on the health and safety form - the Real-Time Monitoring Log.

For any work activity, a sustained (greater than 5 minutes) PID reading in the breathing zone above the levels in the table in Section 7.4 will require vapor suppression or avoidance techniques. If these methods are not feasible or do not reduce the potential exposure below acceptable levels, then employees must upgrade to Level C protection, as necessary.

7.2 INSTRUMENT CALIBRATION

Monitoring equipment will be calibrated and checked for proper operation daily before the start-up of any activities requiring monitoring. Before initiating field activities, background measurements will be obtained with each instrument upwind and away from potential Site influences. Instrument calibrations and background levels will be documented on daily air monitoring logs or in a field log.

7.3 USE OF DETECTOR TUBES

Benzene detector tubes should be used to check for benzene if sustained or repeated readings above background are detected with the PID in areas where volatile organics are expected. Benzene-specific detector tubes capable of measuring down to at least 0.5 ppm must be used, e.g., Dräger tube Benzene 0.5/c, 81-01841. Detector tubes should also be drawn periodically if readings on the PID remain above background but initial detector tube readings are negative.

7.4 VOC AIR MONITORING ACTION LEVELS

Constituent	Concentration	Location	Response
Total Organics (PID)	Above background to 0.5 ppm	Worker Breathing Zone – Intrusive activities	Monitoring should occur every 5 minutes after initially exceeding background. After 3 consecutive readings, frequency may be reduced to every 15 minutes until reading drops below background or other action is called for.
Total Organics (PID)	0.5 to 5 ppm	Worker Breathing Zone –Intrusive activities	Use detector tubes to check for benzene.
Benzene (detector tube)	0.5 to 5 ppm	Worker breathing zone – intrusive activities	Upgrade to Level C as above. Cartridges are good for only one day.
Benzene (detector tube)	Above 5 ppm	Worker Breathing Zone – intrusive activities	Control source of vapors. If these cannot be controlled stop work and evacuate the area until vapors dissipate. Monitor from a distance.
Total organic vapors (and benzene below 0.5 ppm.)	5 to 25 ppm	Worker Breathing Zone – intrusive activities	Upgrade to Level C – half or full-face respirator with combination organic vapor and P100 dust cartridges.
Total organic vapors (and benzene below 0.5 ppm.)	Above 25 ppm	Worker Breathing Zone – intrusive activities	If vapors cannot be controlled, stop work and evacuate the area until vapors dissipate. Monitor from a distance.
Total Organics (PID)	Consistently above background.	Worker Breathing Zone – intrusive activities	Arrange for personal air sampling to identify and quantify the potential VOCs.

7.5 REAL-TIME MONITORING - DUST

Monitoring for dust will be conducted prior to and during excavation and other dust generating activities in the areas of concern. A portable aerosol monitor will be used to obtain real-time measurements of dust concentrations upwind, downwind, and cross wind of the work activities and in areas representative of the worker's breathing zone. A Personal DataRAM, or similar instrument, will be used for dust monitoring. Personnel work zone and perimeter dust monitoring will be performed and recorded at the start of potential dust generating operations such as excavating and loading/unloading of trucks, and stockpiling of soil and other dust generating activities. Upwind, background concentrations as well as work area and downwind perimeter area monitoring will be recorded before the start of work and at least every 2 hours during dust generating activities.

For any work activity, a sustained (greater than 5 minutes) dust level in the breathing zone above the concentrations in the following table will require additional dust suppression techniques or working upwind of the contamination. If these methods are not feasible or do not reduce the potential exposure below acceptable levels, then employees must upgrade to Level C protection.

Dust measurements will be made following the manufacturer's instructions on instrument operation and maintenance. The complete manufacturer's operations manual will be on-site at all times.

7.6 AIR MONITORING ACTION LEVELS - DUST

Constituent	Concentration	Location	Response
Dust	Visible	Work zone	If source is site soils, stop work and Control source of dust.
Dust	0 to 3 mg/m ³	Worker's breathing zone	Continue monitoring during work activities. If visible and from site soils, stop work and Control source of dust.
Dust	Above 3 mg/m ³	Worker's breathing zone	Control source of dust. If dust cannot be controlled upgrade to Level C protection.
Dust	Above 1 mg/m ³	Downwind perimeter	Immediately control source of dust. Record actions in field log book.

7.7 PERSONAL AIR SAMPLING

Personal air samples for VOCs will be collected using low flow sampling personal pumps and charcoal tubes and analyzed by NIOSH Method 1500/1501. Air samples for N-nitrosodiphenylamine will be collected according to NIOSH Method 2202 using low flow pumps and Thermosorb-N cartridges. At least one set of personal air samples will be collected at the breathing zone of workers closest to excavation activities (excavator operator and spotter) as well as during clearing and grubbing, utility abandonment and removal, HUB Park drain pipe installation, and slurry wall excavation. PPE levels of protection may change based upon the results of sampling.

Because of changing site conditions and activities the SSO will determine when and where personal air sampling will occur.

If deemed necessary by Site personnel and the Corporate Health and Safety Manager, additional sampling for a wider spectrum of potential Site constituents may be considered, such as mini Summa canisters or other appropriate collection methods.

8.0 MATERIAL HANDLING AND DECONTAMINATION

All waste material, decontamination liquids, and decontamination equipment will be handled in a safe and healthful manner. Decontamination and material handling activities will be carried out within the appropriate work zone.

8.1 DECONTAMINATION

For sampling and monitoring activities decontamination may consist of removing and disposing of soiled gloves and cleaning or disposing of soiled equipment and materials. When construction activities are planned a personnel and equipment decontamination area will be provided by the Construction Contractor where surface contamination and outer protective equipment are removed. This area will be field determined. The GSI representative should be careful to verify appropriate decontamination depending on the procedures implemented.

8.1.1 Personnel Decontamination

During regular maintenance, sampling and monitoring personnel decontamination consists of removal and disposal of gloves after use then washing with soap and water.

The general decontamination procedure during construction activities is as follows.

Level D Decontamination:

- Equipment drop onto plastic drop cloth.
- Wash and rinse boot covers and gloves if to be reused.
- Remove and dispose of Tyvek® suit in a plastic-lined container or plastic bag.
- Remove boot covers and gloves, dispose in plastic bag or lined containers if not to be reused. Place in "decontaminated PPE" container if to be used again.
- Field-wash hands and face.

Level C Decontamination:

- Equipment drop onto plastic drop cloth.
- Wash and rinse boot covers and outer gloves if to be reused.
- Remove boot covers and other gloves; dispose in plastic bag or lined container if not to be reused. Place in "decontaminated PPE" container if to be used again.
- Remove and dispose of Tyvek® suit in a plastic bag or plastic-lined container.
- Wash and rinse inner gloves.
- Remove respirator and place in bin for later cleaning.
- Remove and dispose inner gloves.
- Field-wash face and hands.

Level B Decontamination:

- Equipment drop onto plastic drop cloth.
- Wash and rinse boot covers and outer gloves if to be reused.
- Remove boot covers and other gloves; dispose in plastic bag or lined container if not to be reused. Place in "decontaminated PPE" container if to be used again.
- Remove and dispose of Tyvek® suit in a plastic bag or plastic-lined container.
- Wash and rinse inner gloves.
- Remove SCBA and place in bin for later cleaning.
- Remove and dispose inner gloves.
- Field-wash face and hands.

There may be partial field decontamination before traveling from one work location to another. This may consist of removing or cleaning boots and gloves after completing an activity and before moving to the next work station. The SSO will advise the field crew of any necessary field decontamination procedures.

Respirators, non-disposable protective clothing, and other personal articles must be sanitized before they can be used again unless they are assigned to individuals. The SSO is responsible for monitoring the effectiveness of decontamination procedures and modifying the procedures as necessary to ensure proper decontamination.

8.1.2 Equipment Decontamination

Equipment decontamination will be minimized to the maximum extent possible by reducing the number of equipment pieces that come into contact with contaminated soils and waste. All equipment used in an exclusion zone must be decontaminated before it leaves the Site or is taken into a clean area. Small tools and equipment used in the EZ that become contaminated may be taken to the decontamination area taking care to isolate the tools/equipment from clean materials and equipment. Equipment will be decontaminated using water and biodegradable detergent or other appropriate decontamination methods as recommended by the SSO. Equipment decontamination will be performed on decontamination pads constructed within the exclusion zone. Decontamination water will be collected and pumped to the stormwater collection sumps. Verification that equipment/vehicles leaving the Site have been adequately decontaminated is the responsibility of the SSO.

9.0 EMERGENCY PROCEDURES

Emergency telephone numbers, directions to the nearest hospital, and a route map to the hospital are presented in Appendix B.

9.1 OVERVIEW

Pre-emergency planning consists of the preparation of this emergency response plan, posting of the emergency contact list and hospital route map, assigning emergency functions to on-Site personnel, training of personnel as necessary, and ensuring that emergency procedures and equipment are in place.

The GSI SSO is designated as the Site Emergency Coordinator for GSI's activities and is responsible for field implementation this emergency response plan and has full authority for GSI personnel and GSI subcontractors in the event of an emergency. If outside agencies respond to an emergency the Site Emergency Coordinator will pass the responsibility and authority for emergency response to the Incident Commander for the outside agency as appropriate. The Site Emergency Coordinator will assist outside emergency response agencies as much as possible to control and resolve the emergency. In general, on-site personnel would immediately evacuate the area to the designated safe place of refuge. Communications consist of verbal and hand signals on-site and use of a portable telephone for off-site communication.

The Site Emergency Coordinator, or if the Site Emergency Coordinator is unavailable, the designated alternate on Site, will contact emergency personnel. In the event of severe injury to GSI personnel or subcontractors, GSI may start first aid then contact outside personnel for assistance.

PPE and emergency equipment will be available on-Site for response to minor emergencies. PPE includes gloves, protective clothing, protective booties, and safety glasses.

Safe distances and places of refuge will be upwind of the site activities and will be determined at the time of the emergency based on a combination of site-specific and incident-specific factors. Evacuation routes and places of refuge will be determined before the start of work at the Site and the locations made known to all personnel who enter the Site. The SSO will maintain security around the immediate Site work zones. Because of the limited number of personnel expected to be working on the Site, the SSO will know who is on Site and can control entry of personnel into hazardous areas in an emergency.

There are several potential causes of emergencies at hazardous waste sites. Worker-related emergencies may include:

- Minor accidents like slips, trips, and falls.
- Chemical exposure.
- Medical problems such as heat stress, heat stroke and aggravation of pre-existing conditions.

- Failure of personal protective equipment (tearing or permeation of protective clothing).
- Physical injury, e.g., from flying objects, loose clothing entangled in machinery, serious falls.
- Electrocution.

Waste-related emergencies may include:

- Fire.
- Explosion.
- Leaks.
- Release of toxic vapors.
- Incompatible reactions.
- Collapse of containers.

All personnel, especially the supervisors and SSO, must be constantly alert for indicators of potentially hazardous situations and for symptoms in themselves and others that warn of hazardous conditions and exposures. Before daily assignments the tasks to be performed, time constraints, potential hazards and emergency procedures are reviewed.

Hazard/Recognition	Emergency Action
Fire/explosion – flames/smoke/heat	If small fire use fire extinguisher to put out. If fire spreads beyond control of employees, call the local fire department at 911.
Minor accidents and physical injury	First-aid trained person to examine victim and treat as needed. If more than first-aid is required summon ambulance or transport or hospital.
Chemical exposure (dust, PAHs)	Wash skin, flush eyes. Put sun lotion on affected area and cover skin. See a physician if severe reaction. See first aid procedures below.
PPE in poor condition or missing.	Stop work and ensure that employees wear proper PPE.

Emergency alerting on-site consists of the use of hand signals and/or radio/cell phone communication. Cell phones or the site trailer telephone will be used for off-site communication. Workers notify the Site Supervisor or SSO of any emergency. The Site Supervisor or SSO decides the appropriate action and implements emergency procedures.

Pre-emergency planning consists of the preparation of this emergency response plan, keeping the emergency contact list and hospital route map in the Site trailer and ensuring that a first aid kit is available.

9.2 EMERGENCY MEDICAL TREATMENT AND FIRST AID

In the event of a safety or health emergency at the Site, appropriate emergency measures will immediately be taken to assist those who have been injured or exposed and to protect others from hazards. The project field personnel will take the injured party and transport (if possible) to the

nearest hospital for treatment, after determining whether personnel decontamination can be performed on the injured party.

If the injury to a worker is chemical in nature (e.g., overexposure), the following first-aid procedures will be instituted:

- Eye Exposure - If a solid or liquid gets into the eyes, wash the eyes immediately at the emergency eyewash station using large amounts of water and lifting the lower and upper lids occasionally to help flush the eye. Do not let the victim rub eyes or keep eyes tightly closed. Flush for at least 15 minutes. Obtain medical attention immediately.
- Skin Exposure - Promptly wash the area using mild soap and flooding amounts of water for at least 15 minutes while removing contaminated clothing and shoes. Consult a physician for reddened or blistered skin.
- Swallowing - Do not induce vomiting! Never give anything by mouth to an unconscious person. Call poison control center: 1-800-222-1222.
- Breathing - If a person has difficulty breathing, move the exposed person to fresh air at once. Do not use mouth-to-mouth respiration. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and mask. Keep the affected person warm and at rest. Obtain medical attention as soon as possible.

9.3 EMERGENCY EVALUATION, INVESTIGATION, AND DOCUMENTATION

The GSI Project Manager and/or GSI Health & Safety Manager will evaluate the available information about the incident and GSI's emergency response about what happened, any injuries or casualties, further accident potential, and what can be done to remedy the emergency. The type of response will be based on the available information about the emergency incident.

The emergency incident will be investigated and all findings put in writing as soon as conditions return to normal. Ensure that documentation is as complete as possible by including a chronological history of the incident, facts about the incident and when they became available, titles and names of personnel, actions taken, samples and results, possible exposures, and history of all injuries or illness during or as a result of the emergency. After the situation has returned to normal, all aspects of the emergency incident and the response will be reviewed to assess procedures used, how to improve response, and how to prevent further emergencies.

9.4 SPILL CONTAINMENT

Soils or sediments that spill will be picked up immediately and containerized as appropriate or transported on-site to the stockpile. Sorbent material, shovels and drums are available on-site to handle spills of materials.

10.0 TRAINING

10.1 GENERAL

All employees or other personnel entering the Site Exclusion Zone(s) or Decontamination Zone that are also involved in operations which could involve exposure to hazardous waste will receive training in compliance with OSHA 29 CFR 1910.120.

The training requirements are intended to provide employees with the knowledge and skills necessary to perform hazardous waste Site operations while minimizing the potential for injury. Initial training consists of a minimum of 40 hours of off-Site classroom and practical exercise training. Training must be updated annually with 8 hours of off-Site training. Supervising personnel will complete an 8-hour training session for supervisors. Training will be certified by record and/or certificate.

Initial 40-hour off-site training for hazardous waste site workers consists of classroom coursework and practical exercises that include:

- Safety, health and other hazards present at hazardous waste sites;
- Selection and use of personal protective equipment;
- Work practices to minimize risks from site hazards;
- Safe use of engineering controls and equipment on sites;
- Medical surveillance requirements, including recognition of symptoms and signs which might indicate overexposure to hazards;
- Site control measures;
- Decontamination procedures; and,
- Emergency response and contingency planning.

Supervisors who are responsible for directing others receive the same training as general site workers plus an additional 8 hours of training on topics such as the overall corporate health and safety program and employee training program, management of site zones, PPE, spill containment, monitoring procedures and techniques, and supervisory skills.

Annual 8 hour refresher training is required for all field personnel. This training consists of a review of the elements of the 40-hour course, critique of the past year's incidents, and other relevant topics. Information and training on new technologies or equipment for the improved protection of employees is also presented.

All construction employees are required to have the 40-hour initial training. There are no site-specific task limitations on this project that qualify on-site construction personnel for the 24-hour minimum initial training. Workers on site for a specific limited task, such as land surveying, and who are unlikely to be exposed over permissible exposure limits and published exposure limits must have a minimum 24 hours of off-site instruction.

Personnel responding to Site emergencies have the training and experience to recognize, evaluate, and respond to expected emergency situations. Training includes first aid/CPR courses and the 8-hour supervisor course.

10.2 SITE-SPECIFIC TRAINING

Site-specific training will consist of a health and safety briefing on the following information before any personnel travels to the Site:

- Names of individuals responsible for Site health and safety and methods of communicating safety and health concerns;
- Site-specific health and safety hazards;
- Use of PPE;
- Work practices by which employees can minimize risk;
- Safe use of equipment on-Site;
- Recognition of symptoms and signs of exposure to hazardous materials;
- Site control measures;
- Decontamination procedures; and,
- Emergency response procedures.

The Health and Safety Manager or designee will give the health and safety briefing prior to initiation of field activities. This briefing will be of sufficient duration to address all of the material covered in this HASP. All personnel that will be participating in field activities will have had the opportunity to read this HASP prior to this initial meeting so that any questions they have can be addressed at the initial meeting.

GSI and subcontractor employees will also obtain Solutia's general plant safety orientation.

10.3 SAFETY MEETINGS

Prior to commencing field activities each day, a short briefing will be conducted by the Project Supervisor to address the day's activities. The daily briefing will provide the opportunity for the SSO to address any special health and safety issues and to notify individuals of any deficient areas that need to be corrected or operational changes made that affect field work. The briefing will emphasize the specific concerns associated with the day's planned field activities. Daily weather reports will be reviewed to determine work/rest regimens.

TABLES

**TABLE 1
Exposure Limits and Other Properties of Principal Constituents of Interest
Former Flexsys Nitro Plant, Nitro, WV**

Chemical Compound	Exposure Limits ^[a]	STEL ^[b]	IDLH ^[c]	Vapor Pressure ^[d]	Ionization Potential ^[e]
Benzene	0.5 ppm	5 ppm	500 ppm	75 mm	9.24 eV
Ethylbenzene	100 ppm	125 ppm	800 ppm	7 mm	8.76 eV
Toluene	50 ppm	NE	500 ppm	21 mm	8.82 eV
Xylene	100 ppm	150 ppm	900 ppm	9 mm	8.56 eV
Trichloroethylene	10 ppm	100 ppm	1,000 ppm	58 mm	9.45 eV
N-Nitrosodiphenylamine	NE	NE	NE	??	NA

Chemical Compound	Carcinogen ^[f]	Skin Exposure ^[g]	LEL/UEL ^[h]	Odor Threshold ^[i]	3M/NIOSH Respirator Selection ^[j]
Benzene	YES	NO	1.2 - 7.8%	8.65 ppm	OV
Ethylbenzene	NO	NO	0.8 - 6.7%	2.3 ppm	OV
Toluene	NO	YES	1.1 - 7.1%	0.16 ppm	OV
Xylene	NO	NO	1.0 - 7.0%	0.324 ppm	OV
Trichloroethylene	YES	NO	8-10.5%	1.36 ppm	OV
N-Nitrosodiphenylamine	NO	YES	NA	NE	N95

NOTES:

- [a] Exposure Limit: 8-hour Time Weighted Average (TWA) from the 2010 Threshold Limit Values of the ACGIH, or OSHA Permissible Exposure Limit (PEL), whichever is lower.
- [b] STEL: Short Term Exposure Limit denotes a 15 minute average that may not be exceeded.
- [c] IDLH: Immediately Dangerous to Life or Health - Maximum concentration from which one could escape within 30 minutes without a respirator and without experiencing any irreversible health effects.
- [d] Vapor Pressure: From NIOSH Pocket Guide to Chemical Hazards. Water = 0 mm. Above 1 mm is considered volatile; above 100 mm is considered highly volatile
- [e] Ionization Potential: Expressed in electron volts (eV) from NIOSH Pocket Guide to Chemical Hazards. Used to determine type of detector bulb for the PID.
- [f] Carcinogen: "Yes" indicates compound is a confirmed or suspected human carcinogen by NIOSH, OSHA or ACGIH.
- [g] Skin Exposure: "Yes" indicates potential significant exposure through skin and mucous membranes, either by airborne or, more particularly, by direct contact to ambient vapors.
- [h] LEL/UEL: Lower and upper explosive limits. Percent of material needed in air for ignition when exposed to an ignition source.
- [i] Odor Threshold: Air concentration at which most people can smell the chemical.
- [j] 3M/NIOSH Respirator Selection: Type of respirator recommended by the 3M 2010 Respirator Selection Guide or the NIOSH Pocket Guide to Chemical Hazards. SA = Supplied Air (Level B); OV = Organic Vapor Respirator (Level C); N, R, or P 95, 97, or 100 = Dust and mist respirator (Level C).

NA = not applicable
NE = not established

TABLE 2

**Task-Specific Hazard Assessment with
Proposed Initial Levels of Protection and Air Monitoring Requirements
Former Flexsys Nitro Plant, Nitro, WV**

Task	Chemical Hazard Assessment			Estimated Initial Level of Protection	Real-Time Air Monitoring		Personal Air Monitoring
	VOCs	SVOCs	Other		VOCs	Dust	
Mobilization	LOW	LOW	LOW	D	NO	NO	NO
E&S Controls Installation	LOW-MED	LOW-MED	LOW-MED	D	YES	YES	NO
Site Preparation – Clearing and Grubbing	LOW – MED	LOW – MED	LOW – MED	D, possible upgrade to C	YES	YES	YES
Utility Abandonment and Removal	MED-HIGH	MED-HIGH	MED-HIGH	D, possible upgrade to C or B	YES	YES	YES
Work Pad Preparation	LOW	LOW	LOW	D	YES	YES	NO
HUB Park Drain Pipe Installation	LOW-MED	LOW-MED	LOW-MED	D, possible upgrade to C	YES	YES	YES
Slurry Wall Excavation	MED	MED	MED	D	YES	YES	YES
Site Restoration	LOW	LOW	LOW	D	YES	YES	NO
Demobilization	LOW	LOW	LOW	D	NO	NO	NO

FIGURES

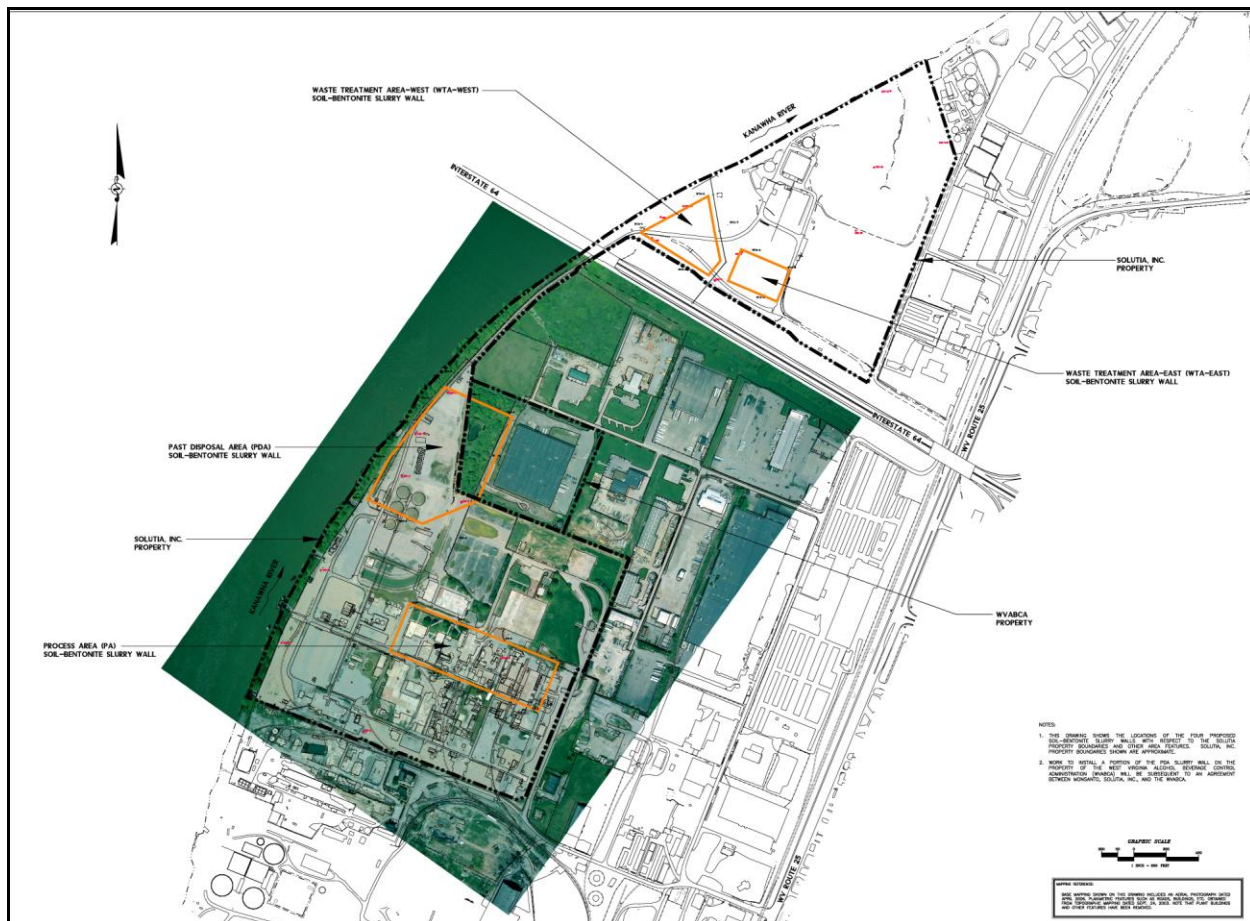


Figure 1 Site Map Showing PDA, PA and WTA

APPENDIX A

HEALTH AND SAFETY FORMS

TAILGATE SAFETY MEETING

Project Name:	Date:
Project Number:	Time: Start: Stop:
Location:	Sheet: ____ of ____
Presented By:	
Topics Covered:	

I have reviewed the Site Health and Safety Plan for the _____ Site and understand the potential health and safety hazards at this operation and the emergency response procedures. I agree to conduct all on-site work in conformity with the requirements of the Health and Safety Plan.

NAME (print)	SIGNATURE	COMPANY

Safety and Health Concerns Expressed during Meeting:

Corrective Actions Taken or Planned:

SUBCONTRACTOR AFFIDAVIT

I have reviewed the Site Health and Safety Plan for the _____ Site and understand the potential health and safety hazards at this operation and the emergency response procedures. I agree to conduct all on-site work in conformity with the requirements of the Health and Safety Plan.

Project Number:

Date:

[illegible]

Site Supervisor _____

GSI ACCIDENT REPORTING FORM

Instructions: For Personal Injuries, Occupational Illnesses, and Property Damage, complete Sections 1 and 2.
For Vehicle Accidents, Complete Sections 1, 2, and 4.

SECTION 1

A. Employee Identification										<input type="checkbox"/> GSI Employee		<input type="checkbox"/> Temporary Employee		<input type="checkbox"/> Subcontractor	
Employee No.		Last Name				First Name				Middle Name/Initial		M or F			
Area Code Telephone Number ()				Address (Street, City, State, Province, Zip Code)											
Date of Hire / /		Position/Title				Supervisor				Employee's Company/Office Location					
B. General Information															
Where did the accident occur? () Office () Project Site				Type of Occurrence () Employee Injury/Illness () Vehicle Accident () Property Damage Only											
Date and Hour of Accident				Date and Hour Reported to Employer				Date and Hour Last Worked				Time Employee Began Work			
Month Day Year		() a.m. () p.m.		Month Day Year		() a.m. () p.m.		Month Day Year		() a.m. () p.m.		() a.m. () p.m.			
Normal Work Hours on Last Day Worked				Witnesses?				Witness Name and Telephone Number							
From:		() a.m. () p.m.		() Yes No											
To:															
C. Project Information (Project Related Accidents Only)															
Project #		Project Name				Project Manager				Site Telephone Number ()				Employee Cell Number ()	
Was the Client Advised of the Accident? () Yes () No				Project Address (Street, City, State, Province, Zip Code)											
Name:				Specific Location of Accident											

SECTION 2

A. Details of the Accident	
1. What job/task was being performed when the accident occurred? (Example: collecting groundwater samples).	
2. Provide a detailed description of the employee's specific activities at the time of the accident. Include details of equipment/materials being used, including the size and weights of objects being handled. If necessary, attach additional pages to the report.	
3. For injuries, identify the specific part of body injured, and specify left or right side. For illnesses, identify and describe the affected area/body part.	
4. Identify the object or substance that directly injured employee and how. Include size and weight of object, quantity of substance, etc.	
5. Identify property damaged and how it was damaged (include owner of property, nature and source of damage, model and serial number, if appropriate).	
B. Health Care/Medical Treatment	
Employee received health care? () Yes () No	Identify the type of health care provided and where it was performed. (Check all that apply). () First Aid () Medical treatment other than first aid (sutures, etc.) () Hospitalized () Clinic () Hospital emergency room () On site by EMT
Name of Health Care Provider, Physician's Name, Address (Street, City, Province/State, and Postal/Zip Code)	

Section 2 (Continued)

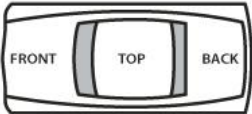
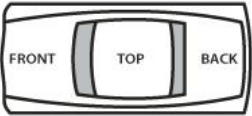
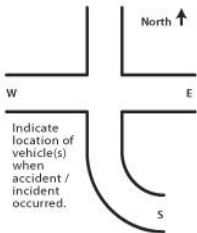
C. Accident Investigation		
H&S plan prepared and on site? () Yes () Not applicable		Did the safety plan identify and provide safety procedures for the specific tasks the employee was conducting when injured? () Yes () No If no, why not? (Explain)
Did the employee have the proper safety training to conduct these tasks or use the equipment? () Yes () No If not, why not?		
Identify all of the potential contributing factors and how they led to the occurrence of the accident. (Lack of attention, wrong use of equipment, lack of training, hurrying/rushing, sort-cutting, environmental conditions, time of day, etc.)		
What contributing factor(s) above was the underlying root cause of the accident.		
Is any training or retraining recommended? If yes, describe.		
What actions have been or will be taken to correct this accident from reoccurring? Verify that these actions will be taken with the PM and/or employee supervisor.		
Additional information: Attach photos, witness statement(s), affected employee statement, accident diagrams, as applicable, to the end of this document.		
Report Date Month Day Year	Report Prepared by: (please print)	Report Prepared by: (signature)

Fax Completed Form to GSI Headquarters Fax: (724) 335-7271

VEHICLE ACCIDENT SECTION

(Complete this Section for all Vehicle Accidents)

SECTION 4

A. GSI Vehicle					
License Plate No.		State/Province		Police Department	City State/Province
Vehicle Year/Make/Model		Odometer Reading at Time of Accident		Police Report Number	Weather Conditions
Name of Person Operating Vehicle			<div style="text-align: center;"> "X" IN AREA OF VEHICLE DAMAGE </div> <div style="display: flex; align-items: center; justify-content: center;">  <div style="margin-left: 10px;"> CIRCLE 0 No Damage 1 Light 2 Moderate 3 Heavy 4 Rolled 5 Burned </div> </div>		
Address					
City	State/Province	Zip Code			
Telephone: Area Code ()					
Vehicle Type: () Personal () Rental () GSI-Own					
Description of Vehicle Damage:					
B. Other Vehicles Involved					
Name of Owner		Address		City/State/Prov./Zip	Area Code and Telephone Number ()
Operator's Name (if different from above)		Address		City/State/Prov./Zip	Area Code and Telephone Number ()
Year/Make/Model	Description of Property Damage:			<div style="text-align: center;"> "x" IN AREA OF VEHICLE DAMAGE </div> <div style="display: flex; align-items: center; justify-content: center;">  <div style="margin-left: 10px;"> CIRCLE 0 No Damage 1 Light 2 Moderate 3 Heavy 4 Rolled 5 Burned </div> </div>	
Insurance Co. Name & Telephone					
License Plate No./State/Province					
C. Injured Persons					
Name	Address Street, City, State/Prov./Zip Code		Phone Number	Nature of Injury	Indicate if Injured was a Vehicle Driver/ Passenger, Employee, Other, or Pedestrian
1.					
2.					
3.					
D. Witnesses					
Name	Address Street, City, State/Prov./Zip Code			Area Code and Telephone Number	
1.				()	
2.				()	
E. Description of Accident					
<div style="border: 1px solid black; padding: 5px;"> <small>PLEASE COMPLETE OR ATTACH SEPARATE DIAGRAM</small>  </div>					
Was Ticket Issued: Other Operator <input type="checkbox"/> GSI Operator <input type="checkbox"/>		Reason: _____ _____ _____			
Report Date Month Day Year	Report Prepared by: (please print)		Report Prepared by: (signature)		

Note: If Additional Space is Required to Complete this Report, Use Separate Sheet of Paper and Attach.

Fax Completed form to GSI Headquarters Fax: (724) 335-7271

REAL-TIME MONITORING INSTRUMENT CALIBRATION LOG

Project Name:		Project Number:
Location:		
Instrument (s):		
Model Number(s):		Serial Number(s):
Calibration Gas(es):	Concentration	

[illegible]

REAL-TIME MONITORING LOG

Date:		Person performing sampling:						
Project Name:		Signature:						
Project No.:								
Time	Monitoring Location (be specific)	READINGS						COMMENTS (Where was sample taken? e.g., breathing zone or other) and Duration of Monitoring
		O ₂ %	LEL %	NH ₃ ppm	Dust mg/m ₃	Noise dB	Detect or Tube (spec. tube)	

Real Time Instrument Calibration Log should accompany this form.

Excavation Checklist

Project: _____ Weather: _____ Date: _____
 Measurements of Trench: Depth: _____ Length: _____ Width: _____
 Soil Type: ____ See attached "Soils Analysis Checklist"
 Type of Protective System Used: _____

1.0 General Inspection of the Job Site

Yes	No	N/A	
___	___	___	Excavations, adjacent areas, and Protective Systems inspected by the Competent person daily, prior to the start of work.
___	___	___	Competent person has the authority to remove workers from the excavation immediately.
___	___	___	Surface encumbrances supported or removed.
___	___	___	Employees protected from loose rock or soil that could possibly pose a hazard by falling or rolling in to the excavation.
___	___	___	Hard hats worn by all employees.
___	___	___	Spoils, materials, and equipment set back a minimum of 2' from the edge of the excavation.
___	___	___	Barriers provided at all remote excavations, well, pits, shafts, etc.
___	___	___	Walkways and bridges, over excavations 4' or more in depth, must be Equipped with guardrails.
___	___	___	Warning vests, or other highly visible garments, provided and worn by all employees exposed to public vehicular traffic.
___	___	___	Employees required to stand away from vehicles being loaded or unloaded.
___	___	___	Employees prohibited from working or walking under suspended loads.
___	___	___	Employees prohibited from working on the faces of sloped or benched excavations above other employees.
___	___	___	Warning system established and utilized when mobile equipment is operating near the edge of an excavation.

2.0 Utilities

___	___	___	Utility companies contacted and/or utilities located.
___	___	___	Exact location of utilities marked when approaching the utilities.
___	___	___	Underground installations protected, supported, or removed when the excavation is open.

3.0 Means of Access and Egress

___	___	___	Lateral travel distance to a means of egress does not exceed 25', for excavations 4' or more in depth.
___	___	___	Ladders, when used, must extend 3' above the edge of the trench and be secured.
___	___	___	Structural ramps used by employees must be designed by a Competent person.
___	___	___	Structural ramps used for equipment must be designed by a Registered Professional Engineer (RPE).
___	___	___	Ramps must be constructed of materials of uniform thickness, securely cleaved together on the bottom, and have a non-slip surface.

Yes No N/A

___ ___ ___ Employees protected from cave-ins while entering, working in, or exiting excavation.

4.0 Wet Conditions

___ ___ ___ Precautions taken to protect employees from accumulation of water.
 ___ ___ ___ Water removal equipment monitored by a Competent person.
 ___ ___ ___ Surface water controlled or diverted.
 ___ ___ ___ Inspection made after each rainstorm

5.0 Hazardous Atmosphere

___ ___ ___ Atmosphere tested when there is a reasonable possibility of oxygen deficiency, or build up of other hazardous gases, that may expose an employee to a hazard.
 ___ ___ ___ Oxygen content is between 19.5% and 21%.
 ___ ___ ___ Ventilation provided to prevent flammable gas from building up to 20% of the lower explosive limit of the gas.
 ___ ___ ___ Testing conducted to ensure that atmosphere remains safe.
 ___ ___ ___ Emergency response equipment readily available where a hazardous atmosphere could or does exist.
 ___ ___ ___ Employees trained on the use of Personal Protective and Emergency Response Equipment.
 ___ ___ ___ Safety harness and life line must be individually attended when an employee entering a deep confined excavation or bell bottom pier.

6.0 Protective Support Systems

___ ___ ___ Materials and/or equipment selected on soil analysis, expected loads, and trench parameters.
 ___ ___ ___ Materials and equipment inspected and in good condition.
 ___ ___ ___ Materials and equipment not in good condition must be removed from service and not returned until repaired, inspected, and approved by a Registered Professional Engineer.
 ___ ___ ___ Protective systems installed without exposing employees to hazards of cave-ins, collapses, or from being struck by materials of equipment.
 ___ ___ ___ Install from the top, down, and from the bottom up.
 ___ ___ ___ Members of Protective Support System must be securely fastened.
 ___ ___ ___ Adjacent structured must be securely supported.
 ___ ___ ___ Excavations below the footing of base must be approved by a Registered Professional Engineer.
 ___ ___ ___ The backfill process must progress with the removal of the support system.
 ___ ___ ___ Materials excavated to a level no greater than 2' from the bottom of the Protective Support System, and only if system is designed to support the Calculated loads.
 ___ ___ ___ Shield system placed to prevent lateral movement.
 ___ ___ ___ Employee prohibited from remaining in a Trench Box when being moved vertically.

Signature of Competent Person:

Date:

7.0 Soils Analysis Checklist

This checklist must be completed when an analysis is performed to determine the soil(s) type present in the excavation. A separate analysis must be performed for each change in soil conditions, such as layers in the excavation wall, if the trench extends long distances, etc.

Project: _____ Weather: _____
Measurements of Trench: Depth: _____ Length: _____ Width: _____
Sample: Location Taken From: _____ Time: _____ Date: _____

8.0 Visual Test

Particle Type: Fine Grained (cohesive) _____ Course Grained (sand or gravel) _____
Water Conditions: Wet _____ Dry _____ Submerged _____ Surface Water Present _____
Previously Disturbed Soils? **Yes** _____ **No** _____
Underground Utilities Protected? **Yes** _____ **No** _____
Layered Soils? **Yes** _____ **No** _____
Layered Soil Dipping into Excavation? **Yes** _____ **No** _____
Excavation Exposed to Vibration? **Yes** _____ **No** _____
Surface Encumbrances Present? **Yes** _____ **No** _____
If yes, what type? _____
Evidence of Cracking or Spilling Observed? **Yes** _____ **No** _____
Potentially Hazardous Atmosphere Exist? **Yes** _____ **No** _____
If yes, identify condition and source: _____
(If yes, follow the company Confined Space Procedures)

9.0 Manual Test

Plasticity: Cohesive _____ Non-cohesive _____
Dry Strength: Granular (crumbles easily) _____ Cohesive (broken w/ difficulty) _____

Note: The following unconfined compressive strength tests should be performed on undisturbed soils.

Thumb Test: used to estimate unconfined compressive strength of a cohesive soil.

Test Performed	Yes _____	No _____
_____ Type "A" Soil:	indented by thumb with very great difficulty.	
_____ Type "B" Soil:	indented by thumb with some difficulty.	
_____ Type "C" Soil:	easily penetrated, or if soil is submerged, seeping or subject to water, runoff, etc.	

Pentrometer or Shearvane: used to estimate unconfined compressive strength of saturated soils.

Test Performed	Yes _____	No _____
_____ Type "A" Soil:	unconfined compressive strength of 1.5 tsf or greater.	
_____ Type "B" Soil:	unconfined compressive strength between 0.5 & 1.5 tsf.	
_____ Type "C" Soil:	unconfined compressive strength of 0.5 tsf or less or if soil is submerged, seeping or subject to water, runoff, etc.	

Wet Shake Test: used to determine the percentage of granular and cohesive materials in a soil Sample. Compare results to a soil textural classification chart.

_____ % granular _____ % cohesive _____ % silt

- ___ Type "A" Soil: clay, silty clay, sandy clay, clay loam, and in some cases silty clay loam, and sandy clay loam.
- ___ Type "B" Soil: angular gravel (similar to crushed rock), silt, silt loam, sandy loam, and in some cases silty clay loam, and sandy clay loam.
- ___ Type "C" Soil: granular soil including gravel and loamy sand.

Note: Type "A" Soil – no soil is a Type A if the soil is fissured, subject to vibration, previously Disturbed, layered dipping in to the excavation on a slope of 4H:1V.

10.0 Soil Classification System

___ Type "A" Soil ___ Type "B" Soil ___ Type "C" Soil

For selection of the appropriate protective system, use the flow chart in Appendix F of the Standard.

- ___ Sloping or Benching (Appendix B) Specify Angle ___
- ___ Timber Shoring (Appendix C)
- ___ Aluminum Hydraulic Shoring (Appendix D)

Signature of Competent Person:

Date:

11.0 Daily Trenching Log

Project: _____ Weather: _____

Was One Call System Contacted (prior to initial excavation)? Yes ___ No ___

Protective System(s): ___ Trench Shield (Box) ___ Wood Shoring ___ Sloping ___ Other ___

Measurements of Trench: Depth ___ Length ___ Width ___

Purpose of Trench: Drainage ___ Sewer ___ Gas ___ Water ___ Other ___

Was a Visual Soil Test Made? **Yes** ___ **No** ___ If yes, what type? _____

Was a Manual Soil Test Made? **Yes** ___ **No** ___ If yes, what type? _____

Type of Soil? _____ Strength of Soil _____

Surface Encumbrances Present? **Yes** ___ **No** ___ If yes, what type? _____

Water Conditions: Wet ___ Dry ___ Submerged ___ Surface Water ___

Potentially Hazardous Atmospheres Exist? **Yes** ___ **No** ___

(If yes, follow the company Confined Space Procedures)

Is Trenching or Excavation Exposed to vehicular traffic (exhaust)? **Yes** ___ **No** ___

(If yes, follow the company Confined Space Procedures)

Are Employees exposed to Public Vehicular Traffic? **Yes** ___ **No** ___

(If yes, warning vests are required)

Are Other Utilities Protected? **Yes** ___ **No** ___

(Water, Gas, Sewer, or other structures)

Are Sewer or Natural Gas Lines Exposed? **Yes** ___ **No** ___

(If yes, follow the company Confined Space Procedures)

Are ladders within 25' of all workers? **Yes** ___ **No** ___

Do ladders extend 3' above the top edge of the excavation? **Yes** ___ **No** ___

Is excavated material stored a minimum of 2' from the edge of the excavation? **Yes** ___ **No** ___

Did Employees receive training in Trenching and Excavation? **Yes** ___ **No** ___

Date and Time of Last Periodic Inspection: _____

Comments and/or Notes: _____

CONFINED SPACE ENTRY PERMIT

Project:	Start Date:	Time:
Project #	Expiration Date:	Time:
Location	Permit Issued by:	Canceled by:
Name/Location of Confined Space:		
Hazard/Material in Confined Space:		
Purpose of Entry:		

Rescue/Emergency Services to Call:	
Contact Method:	Emergency Phone Number:

Monitoring Instruments used:

Frequency of Testing:

O₂/LEL:

Ser.#

Last Calibration:

PID:

Ser.#

Last Calibration: _____

Other:

Ser.#

Last Calibration: _____

Time	O ₂	LEL	CO	VOCs	Other (list)	Test Person
	>19.5%,<23.5%	<10%	<25 ppm			

CHECKLIST	YES	NA	EMPLOYEES ENTERING SPACE		
			NAME	Time In	Time Out
All Lines Blanked or Disconnected					
Electrical Service Disconnected/Locked Out					
Grounding/Bonding Cables in Place					
Electrical Equipment for Explosive Atmosphere					
Ground Fault Circuit Interrupters					
Ignition Sources Removed/Isolated					
Respiratory Protection					
Safety Harness and Lifeline Operational					
Fire Suppression Equipment Available					
SCBA or Separate Air Supply Available					
Ventilation Equipment in Use			ATTENDANT(S)		
Secure Area/Barricade Equipment					
Non-Sparking Tools/Equipment Necessary					
Rescue Equipment (Tripod, winch, etc. needed if vertical drop >5					

Other Permits: Hot Work: Yes No NA

Line Breaking: Yes No NA

Other:

Rescue Procedures: _____

Type of Respirator/Protective Clothing Required: _____

Method of Communication between Entrants and Attendant:

Material Safety Data Sheets Present for Hazardous Materials: 9 Yes 9 No 9 NA

Other Special Precautions or Instructions:

Entry Approved By: _____ Date: _____
(Entry Supervisor)

APPENDIX B

**EMERGENCY CONTACTS AND
HOSPITAL ROUTE MAP**

Map to Thomas Memorial Hospital



Directions:

- Take Route 25 West approximately 0.5 mile to Interstate-64;
- Merge onto Interstate-64 East and continue approximately 9 miles to Exit 54 (MacCorkle Avenue/US 60 towards Jefferson Road/WV 601).
- Turn left at MacCorkle Avenue and continue approximately 0.5 mile.
- Thomas Memorial Hospital is on the left.

Primary Emergency Contacts

Emergency Services	Contact Personnel	Telephone Number
Nitro Fire Department	Emergency Administrative Office	911 (304) 755-1437
Ambulance Kanawha County EMS	Emergency	911
Nitro Police Department	Emergency Administrative Office	911 (304) 755-0777
West Virginia State Police	South Charleston Detachment	(304) 558-7777
Thomas Memorial Hospital	Emergency Department	(304) 766-3601

Additional Emergency Contacts

Services	Contact Personnel	Telephone Number
Solutia, Inc.	Mike House (Office)	(314) 674-6717
Geo-Solutions, Inc.	Ken Andromalos (Cell) Ken Andromalos (Office) Ken Andromalos (Home) Pete Lewis (Cell) Jesse Snyder (Cell)	(412) 965-8604 (724) 353-7273 (724) 325-1626 (412) 973-9417 (724) 822-7620
Chemical-Oil Spills (National Response Center)	No Specific Contact	(800) 424-8802
Centers of Disease Control	No Specific Contact	(404) 639-2888
US EPA Region 3	William Wentworth (Office)	(215) 814-3184 (800) 438-2474
Alcohol Tobacco & Firearms (Explosives Information)	Charleston, WV Field Office	(304) 340 7800
Poison Control Center	West Virginia Poison Center	(304) 347-2412
West Virginia Department of Environmental Protection	Tom Bass (Office) Tom Bass (Cell) Office	(304) 926-0499 ext. 1274 (304) 389-7596 (304) 759-0515